Puget Sound Funding Recipients (FFY 2012)

A. Summary Information

Title: Monitoring water quality at the ground water table beneath areas of dairy manure application to assess manure management strategies, Whatcom County, Washington

Abstract: In many areas of Washington State where heavily impacted water resources are present and where agriculture and increasing population pressures are co-located poorly managed agriculture practices (in particular, manure application) have repeatedly been advanced as a leading contributor to water pollution in the watersheds. The fate of nitrogen applied to soils in the form of dairy manures is a key environmental question. Quantitative details of seasonal variability in soil nitrogen budget beneath these fields and the effects on underlying groundwater quality are not well documented. An alternate and innovative strategy is being evaluated to identify appropriate risk-management consideration and conditions for scheduling manure application to farm fields based on an analysis of field hydrologic properties, antecedent and short term weather forecast, and field crop nutrient requirements. This study will provide critical data on the effectiveness of the alternate strategy to improve resources protection to off-site migration of nutrient and fecal bacteria thereby reducing impacts on groundwater and ultimately surface waters including the Puget Sound.

Significance to Puget Sound Priorities: This study will provide the data and information to assist the PSP, including state, federal, and tribal agencies to monitor key ecosystem indicators to reduce potential degradation from agriculture runoff and nutrient addition to salmon bearing streams. This study will provide key information to assist Conservation Districts to promote adaptive management approaches is to implementation of Farm Management Plans, achieve of Near-Term Action goals to promote Water-Quality Best Management Practices (C3.1 NTA 1) and ensure compliance with regulatory programs designed to reduce, control, and eliminate pollution from working farms (C3.2), and to promote agronomic applications of nutrients (C3.2.3) as outlined in the updated PSP Action Agenda.

B. Overview of Project in FY 2013

This is an ongoing study that started in FY 2011 and is currently scheduled to run through FY 2014. The objective of this project is to collect and evaluate groundwater chemical data to evaluate the results of an ongoing trial study to evaluate the effectiveness of alternative Manure Application Risk Management strategy designed to reduce off-site migration of nutrients dairy manures applied to farms fields. This study is being conducted in coordination with the Whatcom Conservation District.

The study has four tasks:

Task #1 –Monitoring well installation coordinated with the Whatcom Conservation District ARM soil zone monitoring efforts of manure application effects on water-quality in the soil zone. During FY 2013 monitoring infrastructure will be installed at 2 to 3 additional farm sites. (FY 2013 budget $27,000)

Task #2 –Test and document water quality of recent recharge beneath manure application areas on field sites begun in FY2012 and new site installed in FY2013.
(FY 2013 budget $62,710)

Task #3 – Collect and analyze water-quality samples and groundwater level data to document temporal and local spatial variability in the nutrient content of recent recharge.
(FY 2013 budget $28,325)

Task #4 – Analysis of the data will include estimates of the nutrient flux to groundwater
(FY 2013 budget $37,128)

Task #5 –Data management and report preparation. Data are being review for quality assurance check as received and stored in the National Water Information Storage system.

Partners who have contributed to this work are the Whatcom Conservation District, Washington Department of Ecology. Preliminary results of sampling methods for isolating sample collection from the immediate area of water table were shared with local state and federal governments agencies from both Canada and the United States, University researchers, and farming community and interest groups at the 2012 International Abbotsford-Sumas Groundwater Forum May 2, 2012 held in Abbotsford, British Columbia

C. Deliverables

Study scientists are continuing to collect, evaluating, and analyzing monitoring data. An interpretive report to be published in 2014 will provide resource managers with the scientific information to improve agricultural practices to minimize offsite migrations of nutrients in manures applied to crop fields. All data collected as part of this study will be stored in USGS databases and are available to the public.

D. Major Accomplishments

Tested and documented water quality sampling methods to characterize water quality in the uppermost 6 inches of the groundwater system to isolate and sample most recently recharged groundwater and where the position of the water table may seasonally vary by 5 to 10 feet.

Budget summary for FY 2013

Budget Category	**FY 2013**
Personnel	$36,508
Fringe Benefits	$7,718
Travel	$4,085
Equipment	$2,602
Supplies	$5,168
Contracts	$0
Other	$81,235
Total Direct Charges	**$137,316**
Indirect Charges	$82,188
Total	**$219,504**